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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/046,080 | 01/16/2002 | Yukio Nishimura | 5988-037-27 | 2436 |

7590

09/30/2003

Supervisor, Patent Prosecution Services
PIPER MARBURY RUDNICK & WOLFE LLP
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Washington, DE 20036-2412

EXAMINER

THORNTON, YVETTE C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1752

DATE MAILED: 09/30/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/046,080

Applicant(s)

NISHIMURA ET AL.

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 10/046080 filed on January 16, 2002 and published as US 2002/0132181 A1 on September 19, 2002.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statements filed on June 4, 2002 and May 12, 2003 have been entered and fully considered.

Claim Rejections - 35 USC § 112

3. Claim 12 recites the limitation "the acid diffusion controller" in line 2. There is insufficient antecedent basis for this limitation in the claim. The examiner believes that claim 12 should depend from claim 11 and not claim 1.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

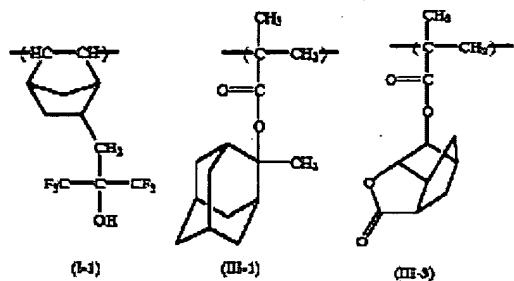
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Nishimura et al. (US 2002/0009668 A1). Nishimura exemplifies in example 18 a radiation sensitive

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composition comprising (1) resin A-24 having the structure:



; (2) 1-(3,5-dimethyl-4-hydroxyphenyl)tetrahydrothiopheniumnonafluoro-n-butanesulfonate as the acid generator; (3) tri-n-octylamine as the acid diffusion control agent; (4) di-t-butyl 1,3-adamantanedicarboxylate as an additional additive; and (5) 2-heptanone and cyclohexanone as a solvent mixture. See Table 2 and paragraphs 0692-0693 and 0747-0768. It is the examiner's position that resin A-24 meets the limitation of claimed resin wherein the second monomer meets the limitations of claimed formula (2) and the third monomer meets the limitations of claimed formula (1). The comprising language of the claims does not prohibit the presence of the additional monomer. Furthermore, the acid generator 1-(3,5-dimethyl-4-hydroxyphenyl)tetrahydrothiopheniumnonafluoro-n-butanesulfonate meets the limitations of claimed formula (3) wherein $n=1$; R_5 is 3,5-dimethyl-4-hydroxyphenyl; and $m=4$.

Although, example 18 does not contain two acid generators, Nishimura clearly exemplifies compositions wherein two acid generators are used in combination (see ex. 7, 8, 11, 14 and 19). One of ordinary skill in the art would readily envisage a composition such as that exemplified in example 18, which contains one or more acid generators.

6. The applied reference has three common inventors with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under

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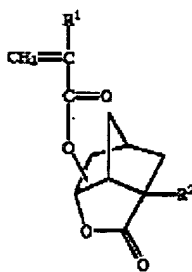
35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

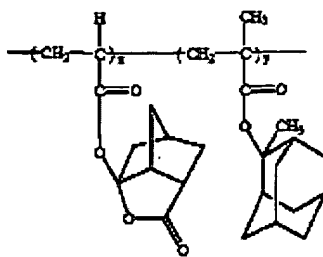
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-11 and 14 are rejected under 35 U.S.C. 103(a) as being obvious over Maeda et al. (US 2001/0026901 A1) in view of Suwa et al. (US 6187504 B1). Maeda teaches a photoresist material comprising at least a polymer composed by copolymerizing (meth)acrylate derivative represented by formula (1) with polymeric compounds and a



photoacid generator (p. 0013).

(1) Example 10 exemplifies the synthesis of



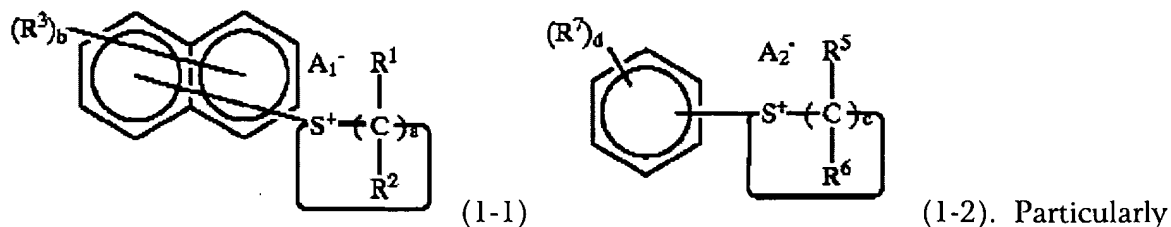
a polymer having the structure:

(p. 0068-0069). A photoacid

generator which can be used in the taught invention is suitably a photoacid generator which can generate an acid by irradiation of a light of 400 nm or less, and any photo-acid generator is acceptable as long as a mixture of the photoacid generator and the taught polymer can be dissolved in an organic solvent. Suitable examples include onium salts, 2,6-dinitrobenzyl esters and sulfosuccinimide compounds (p. 0043-0045). Typical examples of the solvent include, but are not limited to propylene glycol monoethyl ether acetate, methyl 3-methoxypropionate, ethyl 3-methoxypropionate, cyclohexanone, and 1,4-dioxane (p. 0048). Maeda further teaches that if necessary, other additives may be added to the taught material. Examples include organic bases, surface active agents, dyestuff, basic additives, stabilizers, applicable improvers and dyes (p. 0049). The said organic base meets the limitation of an acid diffusion controller.

Maeda however fails to teach the use of a photoacid generator of the claimed formula (3). Maeda does teach that any photo-acid generator is acceptable as long as a mixture of the photoacid generator and the taught polymer can be dissolved in an organic solvent.

Suwa teaches the use of a photoacid generator represented by formula (1-1) or (1-2):



preferred examples of the taught photoacid generators include 4-n-butoxy-1-naphthyltetrahydrothiophenium trifluoromethanesulfonate, 4-methoxy-1-naphthyltetrahydrothiophenium n-nonafluorobutanesulfonate and 4-n-butoxy-1-naphthyltetrahydrothiophenium n-nonafluorobutanesulfonate (c. 7, l. 24-38; c. 31, l. 35-47). Additional examples include 4-methoxy-1-naphthyltetrahydrothiophenium trifluoromethanesulfonate and 3-hydroxy-1-phenyltetrahydrothiophenium trifluoromethanesulfonate (c. 4, l. 29-c. 7, l. 23). Suwa further teaches that the photoacid generators represented by (1-1) or (1-2) can be used in combination with other acid generators such as onium salts, halogen-containing compounds, sulfone compounds and sulfonic acid compounds (c. 7, l. 43-c. 9, l. 21).

One of ordinary skill in the art would have been motivated by the teaching of Maeda to use any conventional photoacid generator in the taught composition. It is the examiner's position that Suwa teaches what is conventional in the art. One of ordinary skill in the art would have been motivated to use a photoacid generator such as those taught by Suwa in the composition of Maeda comprising the preferred polymer of example 10 in order to form a composition which exhibits high sensitivity, and high resolution and is capable of producing fine pattern configuration (see Suwa c. 2, l. 1-10).

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9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US 2001/0026901 A1) in view of Suwa et al. (US 6187504 B1) as applied to claims 1-11 and 14 above, and further in view of Choi (US 6045970 A). Maeda in view of Suwa teaches all the limitations of the instant claims except it fails to explicitly discuss the use of a nitrogen containing organic compound. Maeda does however teach that if necessary, other additives may be added to the taught material. Examples include organic bases, surface active agents, dyestuff, basic additives, stabilizers, applicable improvers and dyes (p. 0049).

Suwa teaches that an organic base in a photoresist composition prevents a decrease in critical size of the pattern after exposure, caused by acid diffusing from an exposed portion of the photoresist to an unexposed portion. Suitable examples include triethylamine, triisobutylamine, diethanolamine and triethanolamine (c. 4, l. 23-31). One of ordinary skill in the art would have been motivated to use triethylamine, triisobutylamine, diethanolamine or triethanolamine as the taught organic base of Maeda in order to prevent a decrease in critical size of the pattern after exposure as it is well known in the art.


10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US 2001/0026901 A1) in view of Suwa et al. (US 6187504 B1) as applied to claims 1-11 and 14 above, and further in view of Ito (US 6093517 A). Maeda in view of Suwa teaches all the limitations of the instant claims except it fails to explicitly discuss the use of a alicyclic additive having an acid-dissociable group. Maeda does however teach that if necessary, other additives may be added to the taught material. Examples include organic bases, surface active agents, dyestuff, basic additives, stabilizers, applicable improvers and dyes (p. 0049).

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Ito teaches that acid sensitive dissolution inhibitors (i.e., stabilizers) are used in conventional photoresist composition to facilitate dissolution after exposure. Examples include t-butyl cholate, t-butyl lithocholate and t-butyl ursocholate (c. 2, l. 37-57). One of ordinary skill in the art would have been motivated to use t-butyl cholate, t-butyl lithocholate and t-butyl ursocholate as the taught stabilizer of Maeda in order to facilitate dissolution after exposure as it is well known in the art.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 703-305-0589. The examiner can normally be reached on Monday-Thursday 8-6:30.
12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet C. Baxter can be reached on 703-308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.
13. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1495.


Yvette Clarke Thornton
Junior Examiner
Art Unit 1752

yct
September 17, 2003